

-8-

REMARKS

The Examiner has rejected Claims 1-24 under 35 U.S.C. 103(a) as being unpatentable over Johnson, U.S. Patent 6,469,704, in view of Deering, Michael F., and Nelson, Scott R., Leo: A System for Cost Effective 3D Shaded Graphics. Applicant respectfully disagrees with such rejection, especially in view of the amendments made hereinabove.

In particular, applicant has incorporated the subject matter of Claims 2 and 3 into independent Claims 1, 8, 15-17, and 24. Now claimed is "graphics floating point data [which] includes fragment data received from a rasterizer that is ... stored in an unclamped format" (emphasis added). The Examiner relies on various excerpts from Johnson to meet applicant's claimed "fragment data received from a rasterizer." However, nowhere in the cited excerpts is there mention of any sort of fragment data, let alone "fragment data received from a rasterizer."

Even if such language or its equivalent was present in Johnson, the Examiner's proposed combination would still fail to meet applicant's claim limitations. Deering merely teaches operating on vertex data in various IEEE floating-point formats. Thus, the Examiner's Johnson-Deering combination would fail to meet applicant's specifically claimed "graphics floating point data [which] includes fragment data received from a rasterizer that is ... stored in an unclamped format" (emphasis added).

Deering's vertex data processing *teaches away* from the *non-analogous* technique of storing fragment data received from a rasterizer in an unclamped format. Thus, only applicant teaches and claims the *unobvious* technique of fragment data processing in an unclamped format. As set forth in the originally filed specification, most computations dealing with fragment data are typically constrained to operate on values in the range [0,1]. Computational results are also typically clamped to the range [0,1]. Color, texture, and depth buffers themselves

-9-

also hold values mapped to the range [0, 1]. Unfortunately, these constraints and the limited precision of typical computations can result in reduced accuracy during graphics processing.

To further distinguish applicant's claimed invention, applicant now claims an "unclamped format dictated by a graphics application program interface" (emphasis added). While Deering merely teaches support for the conversion of multiple numeric formats to 32-bit IEEE floating-point for traditional vertex computations, applicant teaches and claims a fragment-specific unclamped format in association with a graphics application program interface. Thus, applicant's claimed invention permits external access and control of applicant's "unclamped" format for advanced, fragment-specific computations in the specific context of graphics floating point data which includes fragment data received from a rasterizer.

Only applicant teaches such a combination of features for fulfilling the foregoing objectives. To further emphasize these distinctions, applicant has amended Claim 24 to include further graphics application program interface details. A specific prior art showing of such limitations or a notice of allowance is respectfully requested.

With respect to Claims 7, 14, 18 and 19, the Examiner relies on the following excerpts from Deering to show in the prior art applicant's claimed buffer capable of storing graphics floating point data in a graphics pipeline, "wherein the buffer serves as a texture map" (emphasis added).

"Here the concept is that multiple parallel computation units can each process the entire floating-point intensive task, working in parallel on different parts of the scene to be rendered. This allows each pipe to be given a large task to chew on, minimizing handshake overhead." (Page 102, left col., second para., lines 2-4)

"The LeoFloat chips are microcoded specialized DSP-like processors that tackle the floating-point intensive stages of the rendering pipeline. The LeoDraw chips handle all screen space pixel rendering and are directly connected to the frame buffer RAM chips. LeoCross handles the back-end color look-up tables, double buffering, and video timing, passing the final

-10-

digital pixel values to the RAMDAC." (Page 102, right col., lines 4-10)

"To save IC pins and PC board complexity, the internal Leo data bus-ses connecting LeoCommand, LeoFloat, and LeoDraw are 16 bits in size. When colors, normals, and texture map coefficients are being transmitted on the CF-bus between LeoCommand and the Leo-Floats, these components are (optionally) compressed from 32-bit IEEE floating-point into 16-bit fixed point fractions by Leo-Command, and then automatically reconverted back to 32-bit IEEE floating-point values by LeoFloat. This quantization does not effect quality. Color components will eventually end up as 8-bit values in the frame buffer. For normals, 16-bit (signed) accuracy represents a resolution of approximately plus or minus an inch at one mile. This optimization reduces the required data transfer bandwidth by 25%." (Page 104, left col., third para., lines 1-12)

"These are mapped directly into microcode register space. Special instructions allow complete packets to be requested, relinquished, or queued for transmission in one instruction cycle." (Page 104, right col., fifth para., lines 5-7)

It appears that the Examiner has simply gleaned various keywords from such different portions of the Deering reference. Simply nowhere in these excerpts or the remaining reference is there disclosed, taught or suggested applicant's claimed floating-point "buffer [that] serves as a texture map" (emphasis added). Applicant has further emphasized this distinction with the addition of Claim 25 which requires that "the buffer serves as a texture map by using previous rendering results via an extension of an application program interface" (see Claim 25). A specific prior art showing of such limitations or a notice of allowance is respectfully requested.

With respect to the subject matter of Claims 22 and 23, the Examiner has relied on a mention of "pixel-packing conventions" in Johnson to make a prior art showing of applicant's claimed "unpacking/packing the graphics floating point data in the graphics pipeline." To clarify applicant's unique "packing/unpacking," applicant now claims "wherein the packing/unpacking facilitates storage of at least two quantities in a single buffer in a single pass." A specific prior art showing of such limitations or a notice of allowance is respectfully requested.

-11-

All of the independent claims are now deemed allowable along with any claims depending therefrom. An allowance of all pending claims is respectfully requested.

In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 505-5100. The Commissioner is authorized to charge any additional fees or credit any overpayment to Deposit Account No. 50-1351 (Order No. NVIDP069).

Respectfully submitted,

  
Kevin J. Zilka  
Registration No. 41,429

P.O. Box 721120  
San Jose, CA 95172-1120  
408-505-5100

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